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APPLICATION NO...	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,493	02/28/2002	Michael C. Rushford	IL-10738	3025

7590

05/19/2004

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EXAMINER
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CULBERT, ROBERTS P

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<b>Application No.</b> 10/087,493	<b>Applicant(s)</b> RUSHFORD, MICHAEL C.	
	<b>Examiner</b> Roberts Culbert	<b>Art Unit</b> 1763	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-65 is/are pending in the application.
- 4a) Of the above claim(s) 7,21,23 and 34-65 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18-20,22,24 and 25 is/are allowed.
- 6) ☒ Claim(s) 1-4,8-10,15-17,26,27 and 31-33 is/are rejected.
- 7) ☒ Claim(s) 5, 6,11-14, 28 and 29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### *Election/Restrictions*

Applicant's election with traverse of Claims 1-6, 8-20, 22-29, and 31-33 in the response filed 4/23/04 is acknowledged. The traversal is on the ground(s) that the apparatus cannot be used to practice another materially different process such as a non-parallel process. The argument is moot, however, because the apparatus can also be used to practice another materially different process such as a process that uses an etch solution having an etch rate that does not increase with temperature.

The requirement is still deemed proper and is therefore made FINAL.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-4, 8-10, 15-17, 26, 27, and 31-33, are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,904,340 to Miracky et al.**

Referring to the figures and disclosure, Miracky teaches a method of figuring a substrate (58) surface comprising the steps of: contacting the substrate surface with an etchant solution (62), wherein an etch rate of the etchant solution increases with temperature (Fig 7); and generating a local thermal gradient in each of a plurality of selected local regions of a boundary layer of the etchant solution to imagewise etch the substrate surface in a parallel process. (Note that the limitation of generating a local thermal gradient in each of a plurality of selected local regions of a boundary layer of the etchant solution is inherent in the method of Miracky since Miracky heats a plurality of regions on the substrate, which are in direct contact with the etchant solution. It is clear from Fig 5, for example that the substrate is imagewise etched in a parallel process as broadly defined by applicant.

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Miracky further teaches that the step of generating a local thermal gradient in each selected local region comprises locally heating each selected local region, whereby the selected local regions etch the substrate surface at higher etch rates than non-selected local regions and independently controlling the local heating of each selected local region to produce region-specific heating gradients in the boundary layer and thereby imagewise etch the substrate surface at region-specific etch rates as recited in claims 2 and 3.

Regarding Claims 4, 15-17, 26 and 27, Miracky teaches that the local thermal gradient is generated by projecting electromagnetic radiation (laser) towards selected local regions of the boundary layer of the etchant solution and on a heatable material (substrate) in conductive contact with the boundary layer. (Col 1, Lines 13-20) Miracky further teaches that a computer processor is provided to independently control the local heating of each selected region. (Col 4, Lines 33-37)

Regarding Claims 8-10 and 31-33, Miracky teaches that the etchant solution is macro-cooled by fluid convection to a null etch rate whereby no etching takes place prior to the heating of the selected local regions. See Fig 2 and 3 and (Col. 4, Lines 43-68).

***Allowable Subject Matter***

**Claims 18-20 and 22-25 allowed.**

The following is an examiner's statement of reasons for allowance: the prior art of record fails to teach or render obvious a method of figuring a substrate surface comprising the steps of: contacting the substrate surface with an etchant solution, wherein an etch rate of the etchant solution increases with temperature; activating a plurality of selected heaters corresponding to a plurality of selected local regions of a boundary layer of the etchant solution, and chosen from an indexed array of heaters each for locally heating a corresponding local region of the boundary layer upon selective activation thereof; and independently controlling by a computer processor the activation of each selected heaters to produce region-specific heating gradients in the selected local regions of the boundary layer and thereby imagewise etch the substrate surface at region-specific etch rates in a parallel process.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

**Claims 11-14, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to teach or render obvious a method of figuring a substrate surface comprising the steps of: contacting the substrate surface with an etchant solution, wherein an etch rate of the etchant solution increases with temperature; and generating a local thermal gradient in each of a plurality of selected local regions of a boundary layer of the etchant solution to imagewise etch the substrate surface in a parallel process, wherein the step of generating a local thermal gradient in each selected local region comprises locally heating each selected local region, whereby the selected local regions etch the substrate surface at higher etch rates than non- selected local regions wherein the step of locally heating each selected local region comprises activating a plurality of selected heaters corresponding to the selected local regions and chosen from an indexed array of heaters each locally heating a corresponding local region of the boundary layer upon selective activation thereof.

**Claims 5, 6, 28 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to teach or render obvious a method of figuring a substrate surface comprising the steps of: contacting the substrate surface with an etchant solution, wherein an etch rate of the etchant solution increases with temperature; and generating a local thermal gradient in each of a plurality of selected local regions of a boundary layer of the etchant solution to imagewise etch the substrate surface in a parallel

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process, wherein the step of generating a local thermal gradient in each selected local region comprises locally heating each selected local region, whereby the selected local regions etch the substrate surface at higher etch rates than non- selected local regions wherein a computer processor is provided to independently control the local heating of each selected local region and further comprising the step of interferometrically monitoring the substrate surface to deterministically control the computer processor and the region-specific etch rates.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

R. Culbert



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